

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Means for Connecting a Coupling Head to a Trunnion

We, DET DANSKE STAALVÆRKS A/S, a Body Corporate organised under the laws of Denmark, of Frederiksværk, Denmark, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

In connecting a coupling head to a trunnion at the end of a roller shaft great difficulties have always been encountered in providing a sufficiently secure connection between the two members and, more particularly, in ensuring that the assembly is not gradually loosened during operation, since such assemblies are subject to very violent stresses, often in the form of jolts or jerks. Furthermore, the means for connecting the coupling head to the trunnion should be such that the connection and disconnection of the coupling head and the trunnion may be effected as quickly as possible. In this respect also great difficulties have been encountered, because the trunnion and coupling heads are usually of rather large dimensions and are, therefore, rather heavy and cumbersome.

The connecting means most commonly used hitherto comprise a so-called clover-leaf coupling in which the trunnion as well as the coupling head are provided with recesses in the form of a clover-leaf, said recesses containing coupling members (driving dogs), but it has been found that, owing to the action of the sudden and violent stresses which occur, the driving dogs become deformed after a shorter or longer period of use, so that backlash is set up in the assembly.

The object of the present invention is to provide a connecting means in which the above-mentioned drawbacks have been overcome, and according to the invention the trunnion is tapered and the coupling head has a correspondingly tapered bore and the tapered surfaces of the trunnion and the coupling head are formed with recesses

opposite one another so as to form cylindrical bores in which expansible driving dogs are disposed, the trunnion being clamped in the coupling head by means of an axial bolt.

Such a clamping mechanism can easily be assembled, because the outer surface of the tapered trunnion will guide the coupling head into its place and the expansible dogs will secure an effective connection between the trunnion and the coupling head, so that even after a long period of use no backlash will occur between the head and the trunnion. The purpose of the axial bolt is to secure the trunnion to the coupling head when assembled.

In a preferred embodiment of a clamping mechanism according to the invention, each driving dog comprises a longitudinally slotted tube with a cylindrical outer surface and a tapered inner surface, a tapered pin having an axial bore threaded to receive a clamping bolt being provided in said tube. Such a driving dog is very simple to manufacture and can easily be mounted in the recesses in the trunnion, while the coupling head is slid along the trunnion. To further secure the position of the driving dog relatively to the trunnion, more particularly so that the slot in the tube is not positioned along the edges of the recesses, the tube may, according to a further feature of the invention, be provided with a stud in the end of each driving dog remote from the coupling head, said stud engaging a corresponding hole in the trunnion.

By use of a tapered trunnion and a correspondingly tapered bore in the coupling head, it is, of course, possible to provide a clamping of the said two parts in the same manner as is frequently used in cone couplings for revolving tools, but such a clamping means is not in itself necessary in the present case. The main idea of the present invention is to provide a firm engagement between the trunnion and the bore in the coupling head, so that by securing the head in the fully

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assembled position and then tightening the expansible dogs the result is obtained that the whole assembly will act as a unit. On the other hand, it may be preferable to make half the vertical angle of taper of the trunnion at least approximately equal to the angle of friction of the contacting tapered surfaces, whereby the result is achieved that the tapered surface will control the coupling head relatively to the trunnion during assembly, but at the same time it will be possible to disconnect the two parts very easily because after releasing the expansible dogs the coupling head may be removed from the trunnion by a gentle blow.

The invention will be more fully described in the following detailed description with reference to the accompanying drawing, which illustrates an exploded view of a clamping means according to the invention.

Referring to the drawing, a trunnion 1 at the end of a roller shaft has a tapered end portion 2 in which two semi-cylindrical recesses 3 are provided. Furthermore, the portion of a coupling head 4 which faces the trunnion has a tapered bore 5 and two semi-cylindrical recesses 6, which form cylindrical bores with the recesses 3 in the tapered portion 2 of the trunnion 1. In the cylindrical bores are inserted coupling members (driving dogs) each comprising a tube 7 with a longitudinal slot 8 and having a cylindrical outer surface and a tapered inner surface. In the tapered interior of each tube is inserted a tapered pin 9 which has an inner axial thread 10 for a bolt 11, so that by tightening this bolt the pin 9 is drawn axially of the tube 7 thereby expanding the tube and causing it to jam in the bore formed by the recesses 3 and 6. At the end of the tube remote from the coupling head a stud 12 is provided which, during assembly, is introduced into a hole 13 in the trunnion 1 so as to secure the tube in its proper position and to avoid the slot 8 being positioned at the edges of the recesses 3 and 6. To secure the coupling head to the trunnion on assembly, the trunnion has at its end a threaded bore 14 to which a bolt 15 may be screwed and tightened.

When the coupling head is to be fitted on the trunnion, the pins 9 are inserted in the tubes 7 and the latter are placed in the recesses 3, so that the studs 12 enter the holes 13. Then the coupling head 4 is slid on to the trunnion 1 so that the tubes will slide into the recesses 6: the bolt 15 is then screwed

into the thread 14 and tightened. Then the bolts 11 are screwed into the threads 10 of the pins 9 and when said bolts are tightened the tubes 7 will be expanded thereby securing the assembly of the trunnion 1 and the coupling head 4.

When the coupling head 4 is to be removed from the trunnion 1, the bolts 11 and 15 are unscrewed and by a gentle blow on the end of the coupling head 4 the latter may be released and removed. It will thus be seen that the coupling head can be quickly and easily connected to and again disconnected from the trunnion, and the assembly will be sufficiently strong and rigid to resist all stresses to which it may be subjected without setting up any backlash.

WHAT WE CLAIM IS:—

1. Means for connecting a trunnion, for example at the end of a roller shaft, to a coupling head, characterised in that the trunnion is tapered and the coupling head has a correspondingly tapered bore, and the tapered surfaces of the trunnion and the coupling head are formed with recesses opposite one another, so as to form cylindrical bores in which expansible coupling members are placed, the trunnion being clamped in the coupling head by means of an axial bolt.

2. Connecting means according to Claim 1, in which each coupling member comprises a longitudinally slotted tube with a cylindrical outer surface and a tapered inner surface, a tapered pin having an axial bore threaded to receive a clamping bolt being provided in said tube.

3. Connecting means according to Claim 1 or Claim 2, in which the end of each coupling member remote from the coupling head is provided with a stud which engages a corresponding hole in the trunnion.

4. Connecting means according to any one of the preceding claims, characterised in that half of the vertical angle of the taper of the trunnion is at least approximately equal to the angle of friction of the contacting tapered surfaces.

5. Means for connecting a trunnion to a coupling head substantially as described with reference to the accompanying drawing.

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1 SHEET

This drawing is a reproduction of
the Original on a reduced scale.

